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10/749,033	12/30/2003	Jiang Hsieh	130399	8264

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EXAMINER
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BLOOM, NATHAN J

ART UNIT	PAPER NUMBER
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2624

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10/30/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/749,033

Applicant(s)

HSIEH ET AL.

Examiner

Nathan Bloom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08/07/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8, 13, 15, 20, 22-28 is/are rejected.
- 7) ☒ Claim(s) 9-12, 14, 16-19, 21, 23-26 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign-priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 08/24/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Applicants' response to the last Office Action, filed on August 7<sup>th</sup>, 2007 has been entered and made of record.

#### ***Election/Restrictions***

1. Applicant's election with traverse of claims 8-28 in the reply filed on August 7<sup>th</sup>, 2007 is acknowledged. The traversal is on the ground(s) that all the claims "are clearly related". This is not found persuasive because the two species are indeed related, but each species is a different solution to the problem of removing artifacts from the images. In Species I correction is based on a maximum intensity pixel and in Species II the correction is based on a ratio of the intensities of two projections. Thus each species is a patentably distinct invention as it uses two entirely different methods to remove artifacts from the images.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-7 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on August 7<sup>th</sup>, 2007.

#### ***Specification***

3. The disclosure is objected to because of the following informalities: misspelling of the word ratio in paragraph 0037 line 37, wherein it is misspelled as "ration".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 22-28 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for known digital sources (see paragraph 0027 of the specification), does not reasonably provide enablement for unknown or future digital sources (see paragraph 0027 of the specification). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Claims 22-28 require that the program is stored on a computer readable medium and digital sources that are both known (enabled), and unknown (not enabled). Since one of ordinary skill in the art does not know how to make and use something that does not yet exist it is not possible for these unknown medium/sources to be enabled by applicants' provided specification.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

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In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

... a signal does not fall within one of the four statutory classes of Sec. 101.

... signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claims 22-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 22-28 are drawn to functional descriptive material recorded on a computer readable medium. Normally, the claim would be statutory. However, the specification, at paragraph 27 defines the claimed computer readable medium as encompassing statutory media such as a "ROM", "hard drive", "optical drive", etc, as well as *non-statutory* subject matter such as other digital sources such as a network, the Internet, as well as yet to be developed digital means. The use of the term source leaves it open to the interpretation that the source could be a signal instead of the network/internet physical sources such as servers.

A "signal" embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

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Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, or other digital sources such as networks or the Internet. Any amendment to the claim should be commensurate with its corresponding disclosure.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Avinash (US 2003/0128892).

Instant claim 8: A method for facilitating a reduction in image artifacts, said method comprising: receiving data regarding a scan of an object; [See paragraphs 0003 and 0013-0018 wherein data of a CT or MRI scan are received by the data acquisition system shown as 26 in Figure 1.] reconstructing a plurality of images using the received data to form a three-dimensional image space; [This step is not listed by Avinash, but since the method/apparatus disclosed by Avinash receives images that are generated from the reconstruction it is inherent that the reconstruction step has been performed else no images would be received by the system for further processing.]

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calculating an aspect ratio by taking a ratio of an intensity of two projections of the images; and

*[See paragraphs 0018-0028 which describe the normalization/regularization of images ( $A_1, A_2, \dots, A_K, \dots, A_N$ ) by modifying the images by a ratio of the intensities of two views/slices.*

*Furthermore,  $A_1, \dots, A_N$  are views/slices of a 3D body/object, which by definition makes them projections of the 3D body images.]*

filtering based on the aspect ratio. *[See paragraph 0022 wherein an output image is created ( $A_{1M2}$ ) based on the generated ratio.]*

Instant claim 15 describes the method of claim 8 performed by a computer that is “operational coupled to said radiation source and detector”. As per rejection of claim 8 Avinash has disclosed the method. Furthermore, item 28 of figure 1 shows a computer operationally connected (through the control mechanism) to the source and detector assemblies.

Instant claim 22 describes the software implementation of the method performed by claim 8. As per rejection of claim 8 Avinash has disclosed the method. Furthermore, item 28 of figure 1 shows a computer that is used to process the information, but does not explicitly claim or describe the software used to implement it beyond the description of the method steps.

However, it is inherent that there is software stored in a CRM (such as a hard drive, diskette, CD, USB, flash memory, or other forms of tangible memory media) that when executed performs the method described by claim 8 on the computer. If no such instructions existed on a CRM then the computer could not perform the method unless step by step manual manipulation of the entire

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process was carried out by a user, which is not the case in the method/apparatus described by Avinash.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 13, 20, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avinash as applied to claim 8, 15, and 22 above in further view of Liang (US 2003/0076988).

Instant claim 13: A method in accordance with claim 8 further comprises determining a smoothed image from the reconstructed image. *[As per rejection of claim 8 Avinash teaches the limitations described by claim 8, but does not teach the smoothing of the reconstructed image. However, Liang teaches in paragraph 0013 the smoothing of the reconstructed image to reduce noise and artifacts, and further teaches that this was already known in the art. It would have been obvious to one of ordinary skill in the art to combine the teachings of Liang with Avinash to improve image quality by reducing noise as was taught by Liang.]*

Instant claim 20 and 27: *As per rejection of claims 13, 15, and 22 Avinash in view Liang has disclosed the apparatus and software implementation of the method described in claim 13 as well as the apparatus and software implementation of this method.*



***Allowable Subject Matter***

10. Claim 9-12, 14, 16-19, 21, 23-26, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The known prior art does not include:

- The summation of the images to create the projections as described by claims 9, 16, and 23.
- The two projections being horizontal and vertical projections as described by claims 9-11, 16-18, and 23-25.
- The equations for further calculating the filtering and scaling functions as described by claims 12, 14, 19, 21, 26 and 28.

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Flohr (US 6307909) – see equations 13 a-c in column 11 which show ratios of the projections.
- Shin (US 2004/0169658) – calculation of auto correlation function involves calculating a ratio of summations of projections.
- Toth (US 6115487)- use of a ratio of projections to adjust CT images.

***Contact Information***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed, can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NB



SAMIR AHMED  
SUPERVISORY PATENT EXAMINER